

REMARKS

Claims 45 and 50 have been amended to overcome the § 112 rejections at paragraphs 1-4 of the Office Action. A terminal disclaimer of U.S. Application No. 2005-0236363 (11/127,052) is enclosed to overcome the double patenting rejections at paragraphs 5 and 6 of the Office Action. Reconsideration and withdrawal of the remaining rejections are requested in view of the following remarks.

Claim 42 has been amended to clarify that the HF etches the oxidized silicon surface and thins the wafer. Claim 45 has been amended to recite that the HF etches the oxidized silicon surface until the wafer is thinned to approximately 5 to 20% of its initial thickness. Support for these amendments is found at paragraph 0038 of the application, which states, "In a typical wafer thinning application, a silicon wafer is etched from a thickness of 500-1000 microns down to 50-100 microns, preferably from 650-850 microns down to 65-85 microns."

Turning to the § 103 rejections, a Rule 1.132 Bergman Declaration of the inventor Eric Bergman ("the Bergman Declaration"), discussing the differences between the cited references and the pending claims, is enclosed. As discussed in the Bergman Declaration, none of the cited references, alone or in combination, teaches or suggests thinning a wafer via a process of using ozone to oxidize silicon on the wafer and HF to etch away the oxidized silicon, as claimed.

EP '177, as explained in detail at paragraph 4 of the Bergman Declaration, discloses etching an oxide layer on a wafer using HCl, HF, ozone, or mixtures of them, and water. The objective is to remove an oxide film from the wafer. There is no suggestion in EP '177 of thinning the wafer itself. Furthermore, EP '177 teaches

away from the methods of claims 42 and 50, which include backgrinding or plasma etching. Indeed, after being exposed to backgrinding or plasma etching, a wafer surface would not require removal of stray oxide, as performed in EP '177, since either of these processes would have already removed it.

Park, as discussed at paragraph 3 of the Bergman Declaration, describes a process for fabricating a semiconductor device and, more particularly, for using a mixture phase of ozone gas, anhydrous HF gas, and deionized water to control the etch selection ratio between oxide film and polysilicon film. Thus, the process described in Park is directed to fabrication of a semiconductor device on a semiconductor wafer. Park does not teach or suggest appreciably thinning a wafer.

As discussed at paragraph 5 of the Bergman Declaration, even if EP '177 and Park are combined, the result would be a method for removing silicon dioxide and polysilicon using anhydrous HF and ozone with water vapor, followed by a rinse which may use anhydrous HF and ozone. There is no teaching or suggestion in the combination of thinning a semiconductor wafer, or to thin a wafer to approximately 5 to 20% of its initial thickness, or to thin a wafer to 50-100 microns, as recited in claims 42, 45, and 50, respectively. Indeed, any etching of the wafer itself that might occur in such a process would merely be incidental and very minimal (i.e., the wafer would not be appreciably thinned). Thus, claims 42, 45, and 50 are allowable.

Additionally, with respect to the rejections of claims 42 and 50 over the combination of EP '177, Park, Schrafer, or Masumoto, the claims are of course not merely directed to backgrinding or plasma etching. Rather the claims are directed to methods for thinning a wafer, wherein an initial backgrinding or plasma etching step

is performed, followed by chemical thinning with HF and ozone. Schrafer and Masumoto may disclose backgrinding, but they make no suggestion of following such a process with a chemical thinning process, as claimed.

Specific thinning related parameters, such as the etch rates or dimensions recited in claims 33-36 and 46-50, are clearly not taught or suggested by the cited references.

In view of the foregoing, it is submitted that the claims are in condition for allowance. A Notice of Allowance is therefore requested.

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Respectfully submitted,

Customer No. 45540
Perkins Coie LLP
Patent - LA
P.O. Box 1208
Seattle, WA 98111-1208
Phone: (310) 788-9900
Fax: (206) 332-7198

PERKINS COIE LLP

By: Kenneth H. Ohriner
Kenneth H. Ohriner
Reg. No. 31,646